

Assessment of prevalence of acute respiratory tract infection and risk factors in under five children in anganwadi of Kota city

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ABSTRACT

Background: Acute respiratory tract infection (ARI) is a major cause of morbidity and mortality in developing countries.

Objective: To find out the prevalence and risk factors related to ARI among children between 0 and 5 years attending anganwadi centers in Kota city. **Materials and Methods:** A community-based, prospective, cross-sectional study was carried out in 14 Integrated Child Development Services center (seven zones) of Kota city covering 406 under five children during March 2015-February 2016. **Results:** The overall prevalence of ARI was 32% (130/406). Winter season, illiterate mother, >2 under five children at home, overcrowding, smoker in house, family member suffering from cough and cold in last month, smoky chullhas, low birth weight (LBW), partial immunization, inappropriate breastfeeding were significant risk factors for ARI. No association was found between prevalence of ARI and age, sex, religion of child, geographic location of house in terms of main road, place of birth (home or hospital), and birth order of the child. **Conclusion:** The prevalence of ARI was 32%. Significant risk factors were illiterate mother, more than two under five children at home, overcrowding, LBW, partial immunization, lack of exclusive or short duration of exclusive breastfeeding, use of biomass fuel, smoker in house, family history of cough and cold in last month, and kitchen attached to living room.

Key words: Acute respiratory infections, Anganwadi centers, Under five children

Acute respiratory infection (ARI) is a major cause of morbidity and mortality in developing and also in developed countries. ARI is an infection of any part of a respiratory tract or any related structures including paranasal sinuses, middle ear, and pleural cavity. It includes a new episode occurring in an individual who has been free of symptoms for at least 48 h and of <30 days duration except those of the middle ear where the duration of acute episode is <14 days [1].

ARI is an important cause of morbidity in the children. On an average, children below 5 years of age suffer about 5 episodes of ARI per child per year, thus accounting for about 238 million attacks. Although most of the attacks are mild and self-limiting episodes, ARI is responsible for about 30-50% visits to health facilities and for about 20-40% admissions to the hospital. Hospital records from states with high infant mortality rate shows that up to 13% of inpatient deaths in pediatric wards are due to ARI. The proportion of death due to ARI in the community is much higher as many children die at home [2-4].

There are limited studies on the prevalence of ARI and its risk factors in Rajasthan, especially in the anganwadi settings. This study would give an overview of the problem and help to make decisions regarding policy and future planning, especially in terms of health-care provision to children under 5 years of age by providing baseline information. Therefore, we planned this

study to assess the prevalence and risk factors of ARI in children 0-5 years of age attending anganwadi centers of Kota city.

MATERIALS AND METHODS

A community-based, cross-sectional study was carried out in 14 Integrated Child Development Services (ICDS) center of Kota city among under five children from March 2015 to February 2016. Kota city had 273 anganwadi centers, which was distributed in seven zones. From each zones, 2 anganwadi centers were selected by simple random sampling (total 14 anganwadi). We calculate sample size using prevalence of ARI 52% as it had maximum prevalence among all previous study at a confidence level at 95% and margin of error at 5% [3-7]. Sample size for our study design was 406.

Around 29 children (total $14 \times 29 = 406$) were chosen by simple random sampling method from each anganwadi center. At first, written permission from ICDS director was taken for data collection. Data were collected by the investigators with the help of anganwadi worker and ASHA worker. A pre-designed and pre-tested questionnaire was used for data collection. Data were collected about age, sex, birth order, birth weight, place of birth, and immunization status of the child along with other socio-economic factors such as religion, parental socio-economic

status, home atmosphere, type of fuel used, and family history of respiratory illnesses. Data were analyzed using Chi-square test of independence.

RESULTS

A total of 130 ARI cases were found during the study. The overall prevalence of ARI was 32%. Out of 406 children, 56.65% (230) were male, whereas 43.35% (176) children were female. 77 (18.97%) were aged <1 year and 329 (81.03%) were between 1 and 5 years of age. 69.46% (282) were Hindu, 25.12% (102) were Muslim, and 5.42% (22) children belonged to other religion. Various social, demographic, and nutritional factors and their correlation with ARI in children are shown in Table 1.

Prevalence of ARI was significantly higher in children of illiterate mothers (39.8%) ($p=0.007$). According to season wise prevalence, ARI was significantly higher in the winter season (52.6%) as compared to other seasons ($p=0.0005$). Prevalence of ARI was significantly more ($p<0.001$) in children having history of smoker in house (61.5%) and use of smoky chullhas (52.63%). Overcrowding has a direct relationship with the prevalence of ARI ($p<0.001$). Prevalence of ARI was more in children whose family had >2 under five children (48.4%) as compared to children whose family had ≤ 2 under five children (28.9%) ($p=0.002$).

Prevalence of ARI was significantly more in children whose family members had suffered from cough and cold in last month (48.1%) ($p<0.001$). Prevalence of ARI was significantly higher in low birth weight (LBW) child (58.7%). Prevalence of ARI was significantly more in children who were partially immunized (72.7%) ($p<0.001$). According to breastfeeding, the prevalence of ARI was significantly ($p<0.01$) higher in children who were exclusive breastfeed for <6 months (66.3%) as compared to those who were exclusively breastfed up to 6 months (18.2%).

However, no significant association were found between prevalence of ARI and age ($p=0.52$), sex ($p=0.173$), religion of the child ($p=0.14$), location of house in terms of road access ($p=0.169$), place of birth (home or hospital $p=0.094$), and birth order of the child ($p=0.094$). Prevalence of ARI was higher in children of illiterate fathers (42.2%) ($p=0.12$).

DISCUSSION

In the present study, the prevalence of ARI was 32% and very close and comparable to a study of Arun et al. [8] (23%), Sharma et al. [9] (27%), and Islam et al. [10] (26.22%). Prevalence of ARI was more in male as compared to female, which was similar to the study of Prajapati et al. [5] and Islam et al. [10]. The present study showed that the prevalence was more in Muslims (40.2%) followed by Hindu (29.8%) and then in other (22.7%) religion. Similar observation found in a study conducted by Chatterjee et al. [11].

The present study revealed that families having more than two under five children at home were positively associated with ARI. Similar results were found by Broor et al. [12] and

Table 1: Social demographic nutritional factors and correlates of ARI among the study participants

Correlate	ARI absent (%)	ARI present (%)	Total (%)	p value
Age in years				
<1	50 (64.9)	27 (35.1)	77 (100)	$p=0.52$
1-5	226 (68.69)	103 (31.31)	329 (100)	
Sex				
Male	150 (65.2)	80 (34.8)	230 (100)	$p=0.173$
Female	126 (76.4)	50 (28.4)	176 (100)	
Religion				
Hindu	194 (70.2)	84 (29.8)	282 (100)	$p=0.14$
Muslim	61 (59.8)	41 (40.2)	102 (100)	
Others	17 (77.3)	5 (22.7)	22 (100)	
Season				
Winter	55 (47.4)	61 (52.6)	116 (100)	$p=0.0005$
Other	221 (76.21)	69 (23.79)	290 (100)	
House close to main road				
Yes	79 (63.2)	46 (36.8)	125 (100)	$p=0.169$
No	197 (70.1)	84 (29.9)	281 (100)	
Father's literacy				
Literate	250 (69.3)	111 (30.7)	361 (100)	$p=0.12$
Illiterate	26 (57.8)	19 (42.2)	45 (100)	
Mother's literacy				
Literate	179 (73.1)	66 (26.9)	245 (100)	$p=0.007$
Illiterate	97 (60.2)	64 (39.8)	161 (100)	
Number of under five children at home				
<2	243 (71.1)	99 (28.9)	342 (100)	$p=0.002$
>2	33 (51.6)	31 (48.4)	64 (100)	
Number of people sharing child bedroom				
<3	189 (79.7)	48 (20.3)	237 (100)	$p<0.001$
>3	87 (51.5)	82 (48.5)	169 (100)	
Smoker in house				
Yes	40 (38.5)	64 (61.5)	104 (100)	$p<0.001$
No	236 (78.1)	66 (21.9)	302 (100)	
Family member suffered from cough and/or cold in last month				
Yes	69 (51.9)	64 (48.1)	133 (100)	$p<0.001$
No	207 (75.8)	66 (24.2)	273 (100)	
Location of kitchen				
Attached to living room	249 (66.6)	125 (33.4)	374 (100)	$p=0.038$
Not attached to living room	27 (84.4)	5 (15.6)	32 (100)	
Type of fuel used in house				
Non smoky (LPG)	213 (78.0)	60 (22)	273 (100)	$p<0.001$
Smoky	63 (47.37)	70 (52.63)	133 (100)	

(Contd...)

Table 1: (Continued)

Correlate	ARI absent (%)	ARI present (%)	Total (%)	p value
Place of birth				
Home	39 (59.1)	27 (40.9)	66 (100)	p=0.094
Hospital	237 (69.7)	103 (30.3)	340 (100)	
Birth order				
1-2	256 (69)	115 (31)	371	p=0.094
>2	21 (60)	14 (40)	35 (100)	
Birth weight (kg)				
>2.5	182 (79.1)	48 (20.9)	230 (100)	p<0.001
<2.5	31 (41.3)	44 (58.7)	75 (100)	
Exclusive breastfeeding duration (m)				
Up to 6	189 (81.8)	42 (18.2)	231 (100)	p<0.01
<6	35 (33.7)	69 (66.3)	104 (100)	
Immunization of child				
Complete	264 (72.9)	98 (27.1)	362 (100)	p<0.001
Partial	12 (27.3)	32 (72.7)	44 (100)	

Savitha et al. [13]. The present study concludes that children of illiterate mother were more prevalent to ARI, as shown by other authors also [4,11,14,15]. However, no association was found between ARI and literacy status of fathers as shown by other authors [4,5,12,15]. In our study, significantly more cases of ARI were seen in winter season than in other seasons. Similar observations were found by Eccles et al. [16], Erling et al. [17], and Walke et al. [18].

In the present study, overcrowding was found to be a significant risk factor for ARI. Similar observation were by many previous authors also [3,5,9,10,14,19]. Prevalence was also more in children having smoker in their house, and these results were consistent with the studies done by Goel et al. [3], Sharma et al. [9], Islam et al. [10], Broor et al. [12], and Yadav et al. [14]. The present study showed that ARI was more common in children whose family had any member suffered from cough and/or cold in last month as shown by other authors also [12-14]. The present study shows that kitchen attached to living room was significantly associated with ARI, and similar results were found by Islam et al. [10] and Chatterjee et al. [11]. ARI was higher in children having smoky chullahs in their house as shown by other studies [5,8,9].

In our study, LBW children have significantly greater chances of having ARI as compared to normal birth weight children. Similar conclusions were found in studies by Sharma et al. [9] and Mitra [20]. However, we could not found a significant association between ARI and birth order of the child. Similar results were found by Mitra [20]. The present study concluded that exclusive breastfeeding up to 6 months of age is protective in the prevention of ARI. Similar results were seen in studies done by Chatterjee et al. [11] and Broor et al. [12]. In the present study, the prevalence of ARI was significantly more in children who

were partially immunized, and similar results were found by Arun et al. [8], Islam et al. [10], and Broor et al. [12].

Our study has certain limitations such as small sample size. Second, study population included children of anganwadi of Kota city, and it may not be representative of all cases in the community or state. Third, questionnaire method was used in our study which is not always sensitive and specific and subjected to recall bias. Finally, it is not possible to say concretely about the causal association. However, one prime objective was to highlight the magnitude of the problem in our area that was fairly done by this study.

CONCLUSION

The present study highlighted the burden and public health problem of ARI among under five children with 32% prevalence of ARI. Significant risk factors were illiterate mother, families having more than two under five children at home, overcrowding, LBW, partial immunization, lack of exclusive or short duration of exclusive breastfeeding, use of biomass fuel, smoker in house, family history of cough and cold in last month, and kitchen attached to living room.

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